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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/921,681

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Bradford A. Ritter

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03/19/2004

HEWLETT-PACKARD COMPANY  
Intellectual Property Administration  
P.O. Box 272400  
Fort Collins, CO 80527-2400

EXAMINER
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NGUYEN, KIMBINH T

ART UNIT	PAPER NUMBER
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2671

DATE MAILED: 03/19/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/921,681

Applicant(s)

RITTER, BRADFORD A.

Examiner

Kimbhinh T. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 5.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. Claims 1-35 are pending in the application.

#### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 1-9, 11-17, 19-35 are rejected under 35 U.S.C. 102(a) as being anticipated by Peercy et al. (6,163,319).

**Claim 1**, Peercy et al. discloses creating a parametric texture map (bump map texture; col. 10, lines 50-51) that comprises parameters for an equation (lighting equation; equation 20; col. 4, lines 1-20) that defines a surface structure (lighting and coloring) in a manner in which the appearance of the surface structure 9illumination model; col. 16, lines 46-52) includes surface reflectance properties (material emission, material's ambient property, ambient, diffuse and specular; col. 13, lines 53-66); and rendering a digital image using parametric texture map (outputs a final color value based on diffuse and specular components output from bump mapping; col. 16, lines 46-52).

**Claim 2**, Peercy et al. teaches creating parametric texture map such that it models (a modelview matrix) a surface reflectance function defining surface reflectance

properties of surface structure (the height field is defined by a surface parameterization function; col. 21, lines 5-18, lines 34-67).

**Claim 3**, Peercy et al. teaches surface reflectance properties vary in response to a light direction vector and a view direction vector (col. 4, lines 8-24).

**Claims 4-6**, Peercy et al. teaches parametric texture map comprises at least four independent variables (surface independent texture map; equation 20 has a plurality independent variables; col. 14, lines 1-20); parametric texture map comprises at least two independent variables for defining a light direction vector for surface (diffuse light color and specular light color); parametric texture map comprises at least two independent variables for defining a view direction vector for surface reflectance properties (u and v parametric directions and a displacement vector D; col. 5, lines 34-53).

**Claim 7**, Peercy et al. teaches parametric texture map comprises a plurality of texels (the texture map has texels defined by three components  $N_x'$ ,  $N_y'$ ,  $N_z'$ ; col. 3, lines 35-37) and wherein parametric texture map further comprises a plurality of coefficients for each texel, plurality of coefficients (a,b,c) defining lighting characteristics for varying views of the respective texel (col. 3, line 35 through col. 4, line 7).

**Claim 8**, Peercy et al. teaches parametric texture map comprises at least two independent variables (a surface independent texture map) for defining a half-angle vector for the surface (col. 3, line 58 through col. 4, line 7).

**Claim 9**, Peercy et al. teaches parametric texture map comprises at least two independent variables (u,v) for defining a difference vector for surface reflectance properties (col. 17, lines 8-25) .

**Claim 11**, Peercy et al. teaches sampling surface reflectance data and determining at least one coefficient of the parametric texture map based at least in part on the sampled surface reflectance data (environment mapping coefficient of equation 20).

**Claim 12**, Peercy et al. teaches determining six coefficients of the parametric texture map based at least in part on the sampled surface reflectance data (col. 14, lines 1-20).

**Claims 13-17**, the rationale provided in the rejection of claims 4-6, 8 and 9 is incorporated herein.

**Claim 19**, the rationale provide in the rejection of claim 2 is incorporated herein. In addition, Peercy et al. teaches a computer graphics system including a graphics processor (col. 9, lines 24-25) and display 806 (fig. 8).

**Claims 20-24 and 26**, the rationale provided in the rejection of claims 4-6, 8-10.

**Claim 25**, Peercy et al. teaches the graphic processor to render the surface (col. 15, lines 46-57) in real-time (col. 12, lines 33-36).

**Claim 27**, Peercy et al. discloses parametric texture map comprises a plurality of texels (the texture map has texels defined by three components  $Nx'$ ,  $Ny'$ ,  $Nz'$ ; col. 3, lines 35-37), parametric texture map comprises at least two independent variables for defining a view direction vector for surface reflectance properties (u and v parametric directions and a displacement vector D; col. 5, lines 34-53).

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**Claims 28 and 33**, the rationale provided in the rejection of claim 2 is incorporated herein.

**Claim 29**, the rationale provided in the rejection of claim 7 is incorporated herein.

**Claims 30 and 31**, discloses calculating texel display value using the texture map data to render a 3D object by the texture map data (col. 5, lines 29-56).

**Claims 32-35**, the rationale provided in the rejection of claims 8, 9, 28, 30 and 31 is incorporated herein.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Peercy et al. (6,163,319) in view of Cabral et al. (6,697,062).

**Claim 10**, Peercy et al. does not teach BRDF; however, Cabral et al. teaches equation models a Bidirectional Reflectance Distribution Function (BRDF) (col. 3, lines 55-67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the Bidirectional Reflectance Distribution Function taught by Cabral into a bump mapping method of Peercy's teaching for providing surface reflectance to radiance environment map, because it would provide more

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accurate rendering, reflection space IBR is applied to radiance environment maps with a lighting environment (col. 5, lines 21-24).

6. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Peercy et al. (6,163,319) in view of Toh (5,537,494).

**Claim 18**, Peercy et al. does not teach performing a least squares fit algorithm to the sampled surface reflectance data. However, Toh teaches a least square fitting by numerical algorithm (col. 4, line 66 through col. 5, line 5). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the least squares fit algorithm taught by Toh into a bump mapping method of Peercy's teaching for proving surface reflectance to radiance environment map, because it would provide a method of encoding image data, smoothing initial image data to suppress noise and fitting a continuous equation to image intensity profile portions (col. 3, lines 13-17).

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Kimbinh Nguyen** whose telephone number is **(703) 305-9683**. The examiner can normally be reached **(Monday- Thursday from 7:00 AM to 4:30 PM and alternate Fridays from 7:00 AM to 3:30 PM)**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman, can be reached at (703) 305-9798.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

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**Or faxed to:**

**(703) 872-9314 (for Technology Center 2600 only)**

Hand-delivered responses should be brought to Crystal Part II, 2121 Crystal Drive,  
Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or  
proceeding should be directed to the Technology Center 2600 Customer Service Office  
whose telephone number is (703) 306-0377.

March 17, 2004

A handwritten signature in cursive script, appearing to read "Kimbinh Nguyen".

Kimbinh Nguyen

Patent Examiner AU 2671